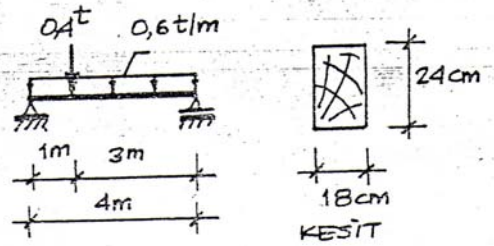
UYGULAMA 6
KESMELİ EĞİLME ETKİSİ

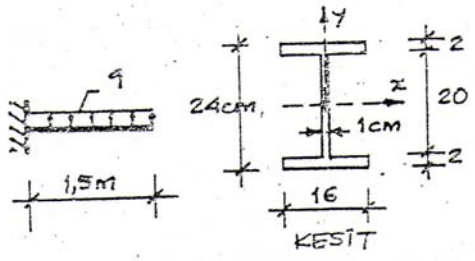
1-)



Şekilde kesit ölçüleri ve yükleme durumu verilen sistemde,
a-) M, T diyagramlarını çiziniz.
b-) Normal ve kayma gerilmesi kontrolu yapınız.

$\sigma_{em} = 110\ kg/cm^2$, $\tau_{em} = 10\ kg/cm^2$

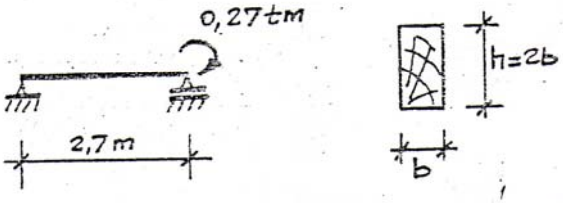
2-)



Şekilde kesit ölçüleri ve yükleme durumu verilen sistemde
a-) Kesitin güvenle taşıyabileceği en büyük Mx momentini ve Ty kesme kuvvetini,
b-) Sistemin güvenle taşıyabileceği en büyük q yükünü hesaplayınız.

$\sigma_{em} = 1{,}40\ t/cm^2$
$\tau_{em} = 0{,}90\ t/cm^2$.

3-)

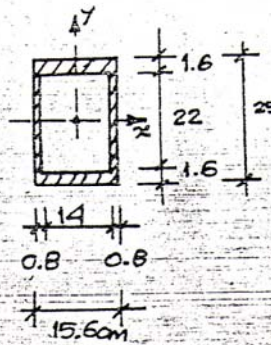


Şekilde kesit ölçüleri ve yükleme durumu verilen sistemde gerekli olan b değerini hesaplayınız

$\sigma_{em} = 80\ kg/cm^2$, $\tau_{em} = 8\ kg/cm^2$.

4-)

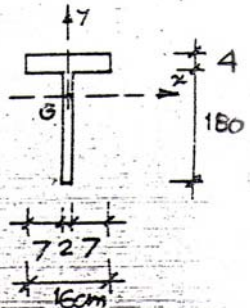
a-)



Şekilde verilen kesitte $(T_Y)_{max}$ ve $(T_X)_{max}$ değerlerini hesaplayınız.

$\tau_{em} = 900\ kg/cm^2$

b-)

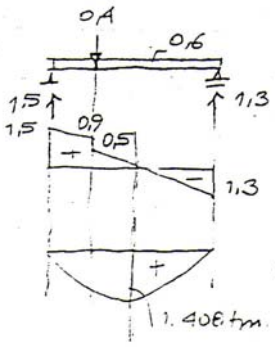


Şekilde verilen kesitte $(T_Y)_{max}$ değerini hesaplayınız. $\tau_{em} = 12\ kg/cm^2$

UYGULAMA 6 ÇÖZÜMLERİ

KESMELİ EĞİLME

1-)



2-) $I_x = 8432\ cm^4$, $W_x = 702,67\ cm^3$.

$(M_x)_{max} = 1,40 \cdot 702,67 \cdot 10^{-2} = 9,84\ tm$ //

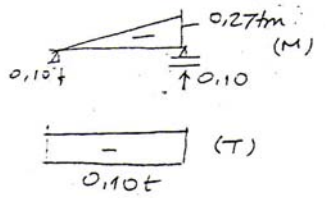
$\tau_{max} = \dfrac{T_{max} \cdot S_x}{I_x \cdot t_g} \leq \tau_{em}$; $S_x = 16 \cdot 2 \cdot 11 + 1 \cdot 10 \cdot 5 = 402\ cm^3$

$\dfrac{(T_y)_{max} \cdot 402}{8432 \cdot 1} = 0,900 \rightarrow (T_y)_{max} = 18,88\ ton$.

$M_{max} = 9 \cdot \dfrac{1,5^2}{2} = 9,84 \rightarrow q = 8,75\ t/m$.

$T_{max} = 9 \cdot 1,5 = 18,88 \rightarrow q = 12,59\ t/m$. $\Rightarrow (q)_{max} = 8,75\ t/m$.

3-)



$\tau_{max} = \dfrac{0,27 \cdot 10^5}{b \cdot \frac{(2b)^2}{6}} \leq 80 \rightarrow b = 7,97\ cm$.

$\rightarrow b \cong 8\ cm$ seçildi.

$h = 2b = 16\ cm$ //

8 / 16

$\tau_{max} = 1,5 \cdot \dfrac{100}{8 \cdot 16} = 1,17 < 8$ ✓

4-) a-) $S_x = 15,6 \cdot 12,6 \cdot 6,30 - 14 \cdot 11 \cdot 5,5$

$S_x = 391,33\ cm^3$; $I_x = 8381,24\ cm^4$.

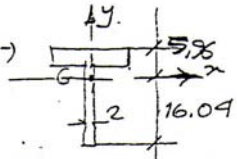
$I_y = 2941,81\ cm^4$

$S_y = 25,2 \cdot 7,8 \cdot 3,9 - 22 \cdot 7,3 \cdot 3,5 = 227,58\ cm^3$

$T_y = \dfrac{I_x \cdot t_g}{S_x} \cdot \tau_{em} = \dfrac{8381,24 \cdot 1,6}{391,33} \cdot 0,9 = 30,84\ t$ //

$T_y = \dfrac{I_y \cdot t_g}{S_y} \cdot \tau_{em} = \dfrac{2941,81 \cdot 3,2}{227,53} \cdot 0,9 = 37,23\ ton$ //

b-)



$I_x = 3845,17\ cm^4$ //

$S_{alt} = 2 \cdot 16,04 \cdot 8,02 = 257,28\ cm^3$ //

$T_{max} = \dfrac{3845,17 \cdot 2 \cdot 12}{257,28} \cdot 10^{-3}$

$(T_y)_{max} = 0,36\ ton$ //